

DECEMBER 2017 Update

Carrier Wi-Fi and LTE-U Forecast

Major changes to the forecast this half include:

1. While LTE-based technologies for the use of unlicensed spectrum bands are likely to be favored, Wi-Fi is expected to remain a part of traditional mobile and telco operators' infrastructure technology choice at key public venues where Wi-Fi remains cost-effective, global standard for roamers. While Mobile Experts continues to expect declining direct carrier investments in Wi-Fi, we forecast a less steep decline in market growth during our forecast period.
2. Meanwhile, we now forecast slightly higher growth in the enterprise Wi-Fi segment rising from \$5.3B in 2016 to \$8.0B in 2022. The underlying factors include the continued wireless data and connected device growth, and 802.11ax refresh cycle expected in 2019.
3. We have reduced our forecast for LWA shipments as we have not seen any market activities beyond early trial and announcement at Chunghwa Telecom and M1 in the Asia-Pacific region. With so many unlicensed technology alternatives, including LAA and MulteFire, along with the upcoming 802.11ax upgrade cycle, it looks like LWA implementation requiring a close coordination of LTE and Wi-Fi infrastructure vendors may be too cumbersome for the incremental benefit of leveraging existing Wi-Fi infrastructure. We remain skeptical that this technology will be widely adopted.
4. Meanwhile, we expect traditional carrier players to mainly focus on LAA and CBRS for traditional mobile service offering. Hence, the broader MulteFire market penetration in the carrier space is unknown at this time.
5. We see strong momentum for LAA adoption as the major operators gear towards "Gigabit LTE" push, leveraging Carrier Aggregation of licensed and unlicensed bands via LAA, 256 QAM, and 4x4 MIMO. While the pre-standard LTE-U was commercialized by T-Mobile in the USA, we expect most operators to leverage LAA gear going forward. With much-publicized small cell siting issues, outdoor LAA deployments were delayed in 2017. Hence, the shipment figures have been reduced to reflect this timing delay. The LAA access investment is expected to grow rapidly (over 100% CAGR) as the "Gigabit LTE" trial momentum in 2017/2018 translates into wider commercial deployments in 2018/2019.
6. On the CBRS front, while the underlying demands across various the customer segments, including mobile and cable operators, and enterprises, remain strong, the fixed wireless access segment has been forecasted down based on market and regulatory dynamics that

likely favor large service providers for the outdoor application. Based on strong interests from large mobile and cable operators for CBRS, PAL license auction may result in higher than expected spectrum costs for smaller fixed wireless access providers to participate and thus limit their participation with CBRS radios for fixed wireless services.

7. MulteFire focus towards “private LTE” and industrial IoT applications, in concert with Release 1.1 specification in first half of 2018, will likely prompt enterprise and OTT/neutral host interests earlier than our previous forecast. Mobile Experts now expects some enterprise/private LTE trials in late 2018 to lead to commercial ramp in 2019.
8. As the LTE-based ecosystems utilizing unlicensed and shared spectrum bands (i.e., LAA, MulteFire, CBRS) matures, the direct carrier investment for Wi-Fi vs. LTE-based access infrastructure is expected to reach parity in 2020. The Carrier Wi-Fi business segment is expected to decline from ~\$600M in 2017 to over \$300M in 2022. Meanwhile, the carrier investment in LTE-based unlicensed and shared technologies (including LAA, CBRS, and MulteFire) is expected to rise from less than \$40M in 2017 to ~\$960M in 2022.
9. In terms of market share, Cisco has maintained its leading position in the Carrier Wi-Fi segment in 2017 even though it has lost share, by our estimate, to more aggressive HPE/Aruba, which has jumped to the number 2 position. Ruckus (now ARRIS) has maintained its Wi-Fi business relatively unscathed through its complex “Brocade-Broadcom-ARRIS” acquisition journey. We expect Ruckus to become a stronger competitor as it leverages its parent company’s strong relationships with cable operators. In the overall Wi-Fi market, Ubiquiti and other aggressive challengers are gaining share, and they are expected to bring price-competitive 802.11ax solutions in time to compete against MulteFire solutions in the marketplace.